IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants:	Gregory S. Herman et al.	§	Confirmation No.:	5837
Serial No.:	10/629,066	§	Group Art Unit:	1745
Filed:	07/28/2003	§	Examiner:	T. H. Parsons
For:	Method And System For Collection Of Hydrogen From Anode Effluents	§	Docket No.:	200209441-1

APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Date: August 22, 2007

Sir:

Appellants hereby submit this Appeal Brief in connection with the above-identified application. A Notice of Appeal was filed via facsimile on June 28, 2007.

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I. REAL PARTY IN INTEREST

The real party in interest is the Hewlett-Packard Development Company (HPDC), a Texas Limited Partnership, having its principal place of business in Houston, Texas. HPDC is a wholly owned affiliate of Hewlett-Packard Company (HPC). The Assignment from the inventors to HPDC was recorded on December 12, 2003, at Reel/Frame 014191/0923.

II. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any related appeals or interferences.

III. STATUS OF THE CLAIMS

Originally filed claims: 1-44.

Claim cancellations: 1-26, 33, 35, 39, 42 and 44.

Added claims: None.

Presently pending claims: 27-32, 34, 36-38, 40, 41 and 43.

Presently appealed claims: 27-32, 34, 36-38, 40, 41 and 43.

The Notice of Appeal also listed claim 42 as being subject to this appeal. Claim 42 was previously canceled and was erroneously included in the list of appealed claims.

IV. STATUS OF THE AMENDMENTS

The claims were amended after the final Office action dated March 30, 2007. Specifically, in an Amendment filed June 29, 2007 under 37 CFR § 1.116 after filing of Notice of Appeal (but before filing an appeal brief), Appellants canceled the previously withdrawn claims (claims 1-26).

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Appellants' contribution relates to solid oxide fuel cells and heating such fuel cells during start-up. In accordance with the invention of claim 27, a fuel cell system (e.g., Fig. 1, 100) comprises a fuel cell stack (e.g., Fig. 1, 110) producing an anode effluent stream. The fuel cell system also comprises a hydrogen generation unit (e.g., Fig. 1, 120) configured to produce a hydrogen gas stream from the anode effluent stream of the fuel cell stack, a hydrogen storage unit (e.g., Fig. 1, 160) into which at least a portion of the produced hydrogen gas stream is stored, and a structure (e.g., para. [0022] coupled to the hydrogen storage unit that heats the fuel cell stack by promoting an exothermic reaction using hydrogen from the hydrogen storage unit. See e.g. paras. [0012]-[0026].

In accordance with the invention of claim 26, a fuel cell system (e.g., Fig. 1, 100) comprises a fuel cell stack, a means for obtaining hydrogen from an anode effluent stream of the fuel cell stack, a means for storing said hydrogen, and a means for heating the fuel cell stack and for speeding up fuel cell startup. The means for obtaining hydrogen comprises, for example, "hydrogen selective members, pressure swing adsorption, water gas shift reactors, steam reforming, authothermal reforming, pyrolysis, catalytic partial oxidation, and the like." See para. [0015]. The means for storing hydrogen comprises, for example, "metal hydride beds, hydrogen sorption materials, compressed gas bottles and the like." Para. [0019]. The means for heating the fuel cell stack comprises, for example, an active material such as a hydrogen oxidation catalyst that promotes exothermic reactions when loaded with hydrogen. The active material is contained in the hydrogen storage unit 160 in at least one disclosed embodiment. Para. [0022]. See also paras. [0012]-[0014], [0016]-[0018], [0020]-[0021], and [0023]-[0026].

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 27-31 are anticipated under 35 U.S.C. § 102(e) by Edlund (U.S. Pat. Pub. No. 2002/0114984).

Whether claim 32 is obvious under 35 U.S.C. § 103 over Edlund in view of LaPierre (U.S. Pat. No. 6,348,278).

Whether claims 36-38, 40, and 43 are obvious under 35 U.S.C. § 103 over Edlund in view of Keating (U.S. Pat. No. 3,539,397).

Whether claim 41 is obvious under 35 U.S.C. § 103 over Edlund in view of Keating and LaPierre.

VII. ARGUMENT

A. Overview of Edlund

Edlund is directed to proton exchange membrane (PEM) and alkaline types of fuel cells. Unlike solid oxide fuel cells, the types of fuel cells disclosed in Edlund need not be substantially heated for the fuel cell to operate. Consequently, and as the Examiner seems to agree, Edlund does not include a mechanism to heat the fuel cell stack to expedite fuel cell start-up.

B. Overview of Keating

Keating is directed to a much different type of fuel cell, namely a fuel cell for which heating of the fuel cell stack during start-up is desirable. Keating discloses a "startup heater 60" that is used to heat a coolant which, in turn, is provided to a fuel cell stack to heat the stack.

C. Overview of LaPierre

LaPierre is directed to a method of supplying hydrogen for use in fuel cells. See Title. LaPierre discloses "recycling a portion of the retentate stream to the reforming reactor for increased hydrogen yields." LaPierre also discloses a combustor to combust a portion of the retentate stream to provide heat to the reforming reaction. See Abstract.

D. The § 102 Rejections

1. Claims 27-31 and 34

Claim 27 requires a structure that that "heats said fuel cell stack by promoting an exothermic reaction using hydrogen from said hydrogen storage unit." The Examiner noted that Edlund discloses metal hydride beds that desorb the gas at elevated temperatures. Edlund, however, does not teach or even suggest using heat to heat the fuel cell stack. Edlund does not teach or suggest using heat generated from an exothermic reaction involving hydrogen to heat the fuel cell stack. As noted above, Edlund is directed to proton exchange membrane (PEM) and alkaline types of fuel cells. Para. [0023]. Unlike solid oxide fuel cells, the types of fuel cells disclosed in Edlund need not be substantially heated for the fuel cell to operate. Accordingly, Edlund does not disclose a mechanism or even a desire to heat fuel cells during a start-up process. Thus, although Edlund refers

to metal hydride beds, Edlund does not teach or suggest a metal hydride bed to generate heat for heating the fuel cell stack. No other art of record satisfies this deficiency of Edlund. For at least this reason, the Examiner erred in rejecting claim 27. Claims 28-31 and 34 depend from claim 27. The Examiner erred in rejecting such dependent claims for at least the same reason as for claim 27.

E. The § 103 Rejections

1. Claim 32

Claim 32 depends from claim 27 and thus inherits the limitations of claim 27. As explained above, Edlund does not teach all of the limitations of claim 27. LaPierre does not satisfy the deficiency of Edlund. Thus, at least for the same reason that the Examiner erred in rejecting claim 27, the Examiner erred in rejecting claim 32.

2. Claims 36-38, 40 and 43

Claim 36 requires a "means for heating said fuel cell stack and for speeding up fuel cell startup." The Examiner acknowledged that Edlund lacks such a means. Instead, the Examiner turned to Keating. The Examiner stated that "it would have been obvious to one of ordinary skill in the art...to have modified the fuel cells stack of Edlund et al. by incorporating the startup heater of Keating...thereby improving the overall performance of the fuel cell." Office Action p. 8.

Appellants respectfully submit that the Examiner's analysis is flawed. As explained above, the type of fuel cell (PEM) taught by Edlund need not be substantially heated for the fuel cell to operate and would not benefit from such heating. Thus, one of ordinary skill in the art would not have found it advantageous or desirable to modify Edlund to incorporate Keating's startup heater. Moreover, the Examiner is incorrect in asserting that Edlund's fuel cell would experience an improvement in overall performance if it were modified to include the startup heater of Keating. For at least this reason, the Examiner erred in rejecting claim 36. Claims 36-38, 40 and 43 depend from claim 36 and thus inherit the limitations of claim 36. The Examiner erred in rejecting such dependent claims for at least the same reason as for claim 36.

3. Claim 41

Claim 41 depends from claim 36 and thus inherits the limitations of claim 36. As explained above, the combination of Edlund and Keating do not teach all of the limitations of claim 36. LaPierre does not satisfy the deficiencies of Edlund and Keating. Thus, at least for the same reason that the Examiner erred in rejecting claim 36, the Examiner erred in rejecting claim 41.

F. Conclusion

For the reasons stated above, Appellants respectfully submit that the Examiner erred in rejecting all pending claims. It is believed that no extensions of time or fees are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required (including fees for net addition of claims) are hereby authorized to be charged to Hewlett-Packard Development Company's Deposit Account No. 08-2025.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1.-26. (Canceled).

27. (Previously presented) A fuel cell system, comprising:

a fuel cell stack producing an anode effluent stream; and

a hydrogen generation unit configured to produce a hydrogen gas stream from the anode effluent stream of the fuel cell stack;

a hydrogen storage unit into which at least a portion of the produced hydrogen gas stream is stored; and

a structure coupled to said hydrogen storage unit that heats said fuel cell stack by promoting an exothermic reaction using hydrogen from said hydrogen storage unit.

28. (Original) The system according to claim 27 wherein the hydrogen storage unit comprises one or more mechanisms selected from the group consisting of metal hydride bed, hydrogen sorption material, and compressed gas bottle.

29. (Previously presented) The system according to claim 27 wherein the structure comprises a metal hydride.

30. (Original) The system according to claim 27 wherein the hydrogen generation unit comprises a hydrogen separation membrane.

31. (Original) The system according to claim 27 further comprising a temperature control unit.

32. (Original) The system according to claim 31 wherein the temperature control unit is a heat exchanger.

33. (Canceled).

34. (Original) The system according to claim 27 further comprising:

a hydrogen means for providing additional power during high load on the fuel cell stack.

35. (Canceled).

36. (Previously presented) A fuel cell system, comprising:

a fuel cell stack; and

a means for obtaining hydrogen from an anode effluent stream of the fuel cell stack;

a means for storing said hydrogen; and

a means for heating said fuel cell stack and for speeding up fuel cell startup.

37. (Original) The system according to claim 36 wherein the means for hydrogen storage comprises a metal hydride.

38. (Original) The system according to claim 36 wherein the means for obtaining hydrogen comprises hydrogen separation membrane.

39. (Canceled).

40. (Original) The system according to claim 36 further comprising a temperature control unit.

41. (Original) The system according to claim 36 wherein the temperature control unit is a heat exchanger.

42. (Canceled).

43. (Original) The system according to claim 36 further comprising:
a hydrogen means for providing additional power during high load on the fuel cell stack.

44. (Canceled).

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.